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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/628,946	07/28/2003	Daniel A. Kearn	10019358-1	9103

22879 7590 08/27/2007
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INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

EXAMINER

ALEJANDRO, RAYMOND

ART UNIT	PAPER NUMBER
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1745

MAIL DATE	DELIVERY MODE
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08/27/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/628,946

Applicant(s)

KEARL ET AL.

Examiner

Raymond Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-64 is/are pending in the application.
- 4a) Of the above claim(s) 6,8,10-15,18-27 and 42-64 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7, 9, 16-17, 28-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

This Examiner's letter is in reply to applicant's communication filed 08/06/07. The applicant has overcome the objections and most of the 35 USC 112 rejections. The Applicant has not satisfactorily overcome the prior art. Refer to the abovementioned amendment for specific details on applicant's rebuttal arguments and remarks. Therefore, the present claims are finally rejected over the same grounds of rejection as set forth hereunder and for the reasons of record:

Election/Restrictions

1. This application contains claims 6, 8, 10-15, 18-27 and 42-64 drawn to an invention nonelected with traverse in the reply filed on 06/23/06. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 7 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
4. The term "suitable" in claim 7 (line 5) is a relative term which still renders the claim indefinite. The foregoing is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be

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reasonably apprised of the scope of the invention. *Currently, the extent or degree of how suitable a material can be to form a chamber is unknown.*

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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8. Claims 3 and 38 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Jankowski et al 2003/0039874.

Jankowski et al discloses thin-film deposition techniques to form a MEMS-fuel cell system (P0044, 0033, 0042, Abstract, Title). Specifically, disclosed therein is that series of thin film materials such as an electrode/catalyst, electrolyte and electrode/catalyst can be formed by a variety of thin-film depositions techniques (P0044). Substrates 11, 14 and 16 are also present during the deposition (P0032-0033). Substrate 14 includes a fuel inlet 15, and substrate 16 includes an oxidant inlet 17; additionally, host substrate 11 is provided with a plurality of openings, channels, pores or windows (P0032). Jankowski et al disclose incorporation of manifold structure within the host substrate (P0033).

Figures 1-3 below show the thin-film deposited MEMS-fuel cell of Jankowski et al. It can be appreciated from observing Figure 1, that substrates 11, 14, and 16 provide cavities and opening/channels or inlets 15, 17, respectively. *These cavities can be taken as chambers.*

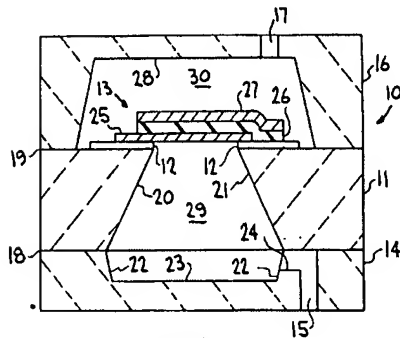


FIG. 1

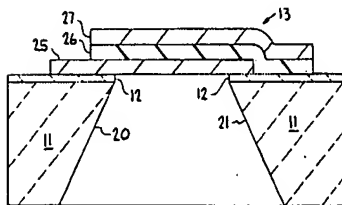
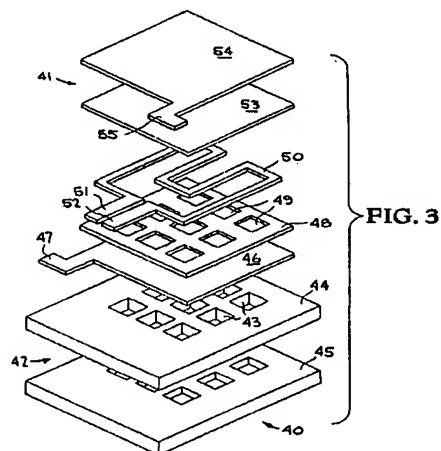


FIG. 2



Examiner's note: it is noted that the instant claims are being construed as product-by-process claims (i.e. a fuel cell being made by the method of either claim 1 or claim 36) and that the product itself does not depend on the process of making it. Accordingly, in a product-by-process claim, the patentability of a product does not depend on its method of production. In that, it is further noted that the product in the instant claims is the same as or obvious over the product of the prior art. *In re Thorpe* 777 F.2d 695, 698, 227 USPQ 964,966 (Fed Cir. 1985) and MPEP 2113. As a result, the process steps of a product-by-process claim do not impart any significant property or structure to the claimed end product. And, if there is any difference, the difference would have been minor and obvious. Therefore, the present claims are unpatentable over a reference that satisfies the claimed compositional or physical or property or structural limitations, and/or a reference that discloses a product made by a process that reasonably substantially comprises every limitation of the claimed process.

Therefore, Jankowski et al anticipate the present claims. However, if the claims are not anticipated the claims are obvious as it has been held similar products claimed in product-by-process limitations are obvious *In re Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972) and *In re Fessmann*, 489 F.2d 742, 744 180 USPQ 324, 326 (CCPA 1974); See also *In re*

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Best, 195 USPQ 430 (CCPA 1977) [prove that prior art products do not necessarily or inherently possess characteristics] & *Ex parte Gray, 10 USPQ2d 1922 (BPAI 1989)* [needs to show that the claimed process imparts unexpected property or structure](Refer to MPEP 2113: *Product-by-Process Claims*).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 1, 4, 5, 7, 9, 16-17, 28-37 and 40-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jankowski et al 2003/0039874.

The present claims are geared towards a fabrication method for a MEMS-based fuel cell wherein the disclosed inventive concept comprises the specific deposition steps.

As to claims 1, 16-17 and 36-37:

Jankowski et al discloses thin-film deposition techniques to form a MEMS-fuel cell system (P0044, 0033, 0042, Abstract, Title). Specifically, disclosed therein is that series of thin film materials such as an electrode/catalyst, electrolyte and electrode/catalyst can be formed by a variety of thin-film depositions techniques (P0044). Substrates 11, 14 and 16 are also present during the deposition (P0032-0033). Substrate 14 includes a fuel inlet 15, and substrate 16 includes an oxidant inlet 17; additionally, host substrate 11 is provided with a plurality of openings, channels, pores or windows (P0032). Jankowski et al disclose incorporation of manifold structure within the host substrate (P0033).

Figures 1-3 below show the thin-film deposited MEMS-fuel cell of Jankowski et al. It can be appreciated from observing Figure 1, that substrates 11, 14, and 16 provide cavities and opening/channels or inlets 15, 17, respectively. *These cavities can be taken as chambers.*

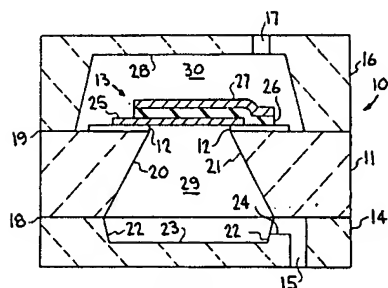


FIG. 1

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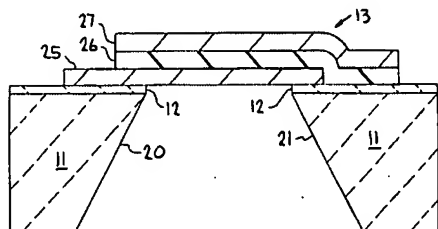


FIG. 2

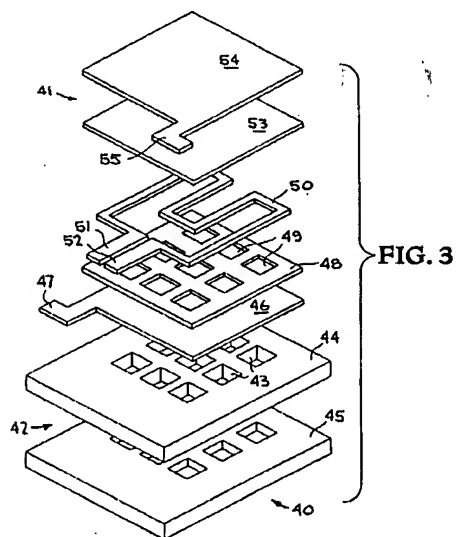


FIG. 3

As to claim 4:

Enlarged portion of Figure 1 illustrates that the chamber formed by the substrates 11 and 14 at least extends over at least the entire anode (electrode 25).

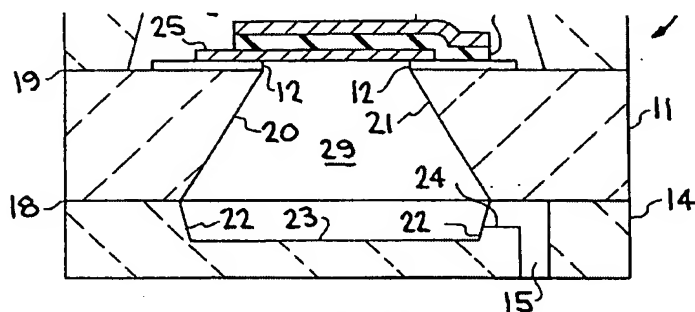


FIG. 1

As to claim 5:

Solid oxide electrolytes are disclosed (Abstract, P0029, 0031-0032, 0037-0038).

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As to claims 7, 28 and 40-41:

Jankowski et al disclose that an area of the substrate material is removed following deposition of the electrode-electrolyte-electrode layers 13 (P0032). Patterning by etching is disclosed (P0031, 0033, 0035, 0042). *It is to be noted that the removal of substrate material also encompasses patterning the removed area.*

As to claim 9:

Jankowski et al discloses substrate materials such as a nitride layer (P0032), or Si-based substrates (P0031). *These are non-electrolyte materials.*

As to claims 29-35 and claim 36:

Jankowski et al makes known that substrate 14 includes a fuel inlet 15, and substrate 16 includes an oxidant inlet 17; additionally, host substrate 11 is provided with a plurality of openings, channels, pores or windows (P0032, 0042/FIGURE 1). Jankowski et al disclose incorporation of manifold structure within the host substrate (P0033, 0039). *Substrates 14 and 16 represent two different cavities/chambers including openings 15 and 17, respectively.*

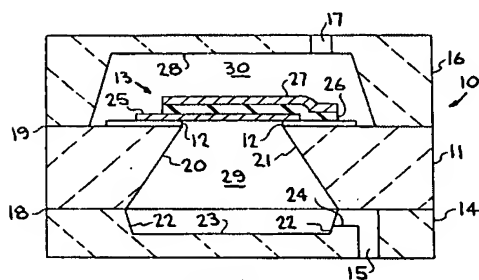


FIG. 1

Examiner's note: *The recitation "adapted to" or "adapted for" clauses are examples of claim language that may raise a question as to the limiting effect of the language in a claim (See MPEP 2111.04 [R-3] "Adapted to," "Adapted for," "Wherein," and "Whereby" Clauses). Claim scope is not limited by claim language that suggests or makes optional but does not*

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require steps to be performed, or by claim language that does not limit a claim to a particular structure. See Hoffer v. Microsoft Corp., 405 F.3d 1326, 1329, 74 USPQ2d 1481, 1483 (Fed. Cir. 2005) & Minton v. Nat 'l Ass 'n of Securities Dealers, Inc., 336 F.3d 1373, 1381, 67 USPQ2d 1614, 1620 (Fed. Cir. 2003).

Jankowski et al disclose forming a MEMS-fuel cell system as seen and described above. However, the preceding prior art reference does not expressly disclose the specific order of the deposition steps.

In view of the above, it would have been obvious to a person possessing a level of ordinary skill in the pertinent art at the time the invention was made to perform Jankowski et al's deposition steps in the order or sequence as instantly claimed because a change in sequence of adding ingredients is prima-facie obvious. Consequently, reversing the order of the prior art process steps (*Ex parte Rubin* 128 USPQ 440); selection of any order of performing process steps (*In re Burhans* 69 USPQ 330); or selection of any order of mixing ingredients (*In re Gibson* 5USPQ 230) are all prima facie obvious in the absence of new or unexpected results (See MPEP 2144.04 [R-1] Legal Precedent as Source of Supporting Rationale: IV. Changes in Sequence of Adding Ingredients). *Particularly, applicant's invention is obvious by operation of law as Ex parte Rubin , 128 USPQ 440 (Bd. App. 1959) is settled law. (Prior art reference disclosing a process of making a laminated sheet wherein a base sheet is first coated with a metallic film and thereafter impregnated with a thermosetting material was held to render prima facie obvious claims directed to a process of making a laminated sheet by reversing the order of the prior art process steps.).*

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13. Claims 2 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jankowski et al 2003/0039874 as applied to claims 1 and 36 above, and further in view of Sasahara et al 2002/0012825.

Jankowski et al is applied, argued and incorporated herein for the reasons manifested above. However, the preceding prior art reference fails to explicitly teach the step of patterning the electrolyte.

Sasahara et al disclose a fuel cell wherein the electrolyte/electrode interface has been patterned (Title/Abstract). Sasahara et al disclose that it is known to employ micromachining techniques to pattern the electrolyte (ABSTRACT). Method of making a patterned electrolyte are also disclosed (CLAIMS 21-29) and/or creation of a patterned electrolyte (P0054-0057).

In view of the above, it would have been obvious to a person possessing a level of ordinary skill in the pertinent art at the time the invention was made to provide the step of patterning the electrolyte of Jankowski et al as taught by Sasahara et al because Sasahara et al teaches that the step of patterning an electrolyte allows very precise feature definition thereof, and fuel cells comprising a patterned electrolyte exhibit significantly enhanced volumetric power density when compared with conventional fuel cells. Therefore, a very precise feature definition of an electrolyte and an enhanced volumetric power density fuel cell are the beneficial effects of performing Sasahara et al's patterning step in the electrolyte of Jankowski et al.

Response to Arguments

14. Applicant's arguments filed 08/06/07 have been fully considered but they are not persuasive.

15. With respect to the 35 USC 102/103 Product-by-Process rejection as set forth above in this office action, applicant has contended that *“in comparing the structure of the MEMS-based fuel cell (e.g. FIGS. 1-3) of Jankowski et al with the structures formed by Applicants’ claims 3 and 38, applicant respectfully note that Jankowski et al does not disclose every limitation of the invention claimed by the Applicants”*, specifically, *“The Examiner has mistakenly interpreted fuel inlet 15 and oxidant inlet 17 as chambers”* which includes the limitations of *“extending over at least a portion of at least one of the cathode and anode”* and *“including at least one integral manifold”*. In reply, the Examiner simply asserts that applicant is apparently attributing unrecited structural characteristics or limitations to the term *“chamber”*. Per Merriam-Webster’s Collegiate Dictionary (10th Edition), the term *“chamber”* is defined as *“a natural or artificial enclosed space or cavity”* or *“a compartment”*. Therefore, there is nothing incorrect in asserting that the enclosed space/cavity or compartment formed by either the cavities of substrates 11, 14 and 16, or fuel/oxidant inlets 15 and 17, respectively, extending over at least portion of at least one of the cathode and anode of Jankowski et al, can also serve as the claimed chamber.

It is imperative to note that applicant’s claimed *“chamber”* lacks a sufficiently-structurally defined construction/configuration providing a particular structure differentiating from a plethora of suitable *“chambers”* readable thereon including the one present in the prior art as construed by the Examiner. Absent a particular chamber structure in the present claims, literal claim interpretation of the claims permits to interpret the claim limitations in a broad sense as instantly intended by the applicant. To summarize, the Examiner is still of the view that any one of the substrates 11, 14 and 16 providing respective cavities and/or opening/channels or inlets 15, 17 are capable of being taken as *“the claimed chamber”* for purposes of furnishing a suitable

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representation of a compartment, space or cavity connected to at least a portion of either the anode or cathode for distributing fuel or oxidant into the anode or cathode which is a substantial synonym of applicant's limitation of "*a chamber*", "*extending over at least a portion of at least one of the anode/cathode*", and "*including at least one integral manifold for at least fuel or oxidant*". Consequently, the chamber structure of applicant's invention is substantially same as the chamber structure of the prior art; and the prima-facie case of anticipation/obviousness as set forth by the product-by-process rejection has not been satisfactorily overcome and is still fully applicable to the invention at hand.

All of the foregoing discussion applies with equal force to the arguments articulated by the applicant with respect to the 35 USC 103 rejection over Jankowski et al. In traversing the rejection under Section 103, applicant presented the same line of reasoning taken for traversing the rejection under Section 102/103 based on product-by-process. In a summarized reply, the examiner opines that the chamber structure of the prior art as discussed above is substantially the same as the chamber structure claimed by the applicant. Thus, there is NO significant distinction between the prior art of record and the invention in question so as to support applicant's position that the prima-facie case of obviousness is improper

Contrary to applicant's assertion, under the product-by-process rejection doctrine it is unnecessary to provide a motivational statement for setting forth the prima-facie case of obviousness or to discuss the obviousness of the differences between the prior art and claimed invention. The Examiner calls applicant's attention to *MPEP 2113 Product-by-Process*. In this case, suffice it to say that the chamber structure of applicant's invention is substantially same as

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the chamber structure of the prior art; and this strongly supports the rejection under the 35 USC 102/103 statutes.

16. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "the single substrate") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). *In this case, the number of substrates employed by Jankowski et al (i.e. three different substrates 11, 14 and 16) is irrelevant to the point postulated by applicant regarding "the single substrate" because NOTHING in the present claims clearly or fairly stipulates either the number of substrates or the substrate structure ultimately intended by the applicant.*

17. Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references. Applicant's arguments do not comply with 37 CFR 1.111(c) because they do not clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. Further, they do not show how the amendments avoid such references or objections. *This is postulated to address applicant's arguments concerning claims 16 and 37 for which applicant has contested that they apparently "properly recite narrower scope than their parent claims". Moreover, the motivational statement based on the changing the sequence of adding ingredients, reversing the order of*

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performing steps and/or selection of any order of performing process steps fully addresses the limitations of the foregoing claims as an obvious modification in view of the settled law.

18. With respect to applicant's arguments about the recitation "adapted to" or "adapted for", it is to be noted that such recitations or language does not distinguish over prior art because the recitation that an element/feature/member is "*adapted to/for*" perform a function is not a positive limitation but only requires the ability to so perform. *See MPEP 2111.04*

Conclusion

19. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Raymond Alejandro
Primary Examiner
Art Unit 1745


RAYMOND ALEJANDRO
PRIMARY EXAMINER